



Source Water Assessment Program (SWAP) Report For Freetown Elementary School

What is SWAP?

The Source Water Assessment Program (SWAP), established under the federal Safe Drinking Water Act, requires every state to:

- ? Inventory land uses within the recharge areas of all public water supply sources;
- ? Assess the susceptibility of drinking water sources to contamination from these land uses; and
- ? Publicize the results to provide support for improved protection.

SWAP and Water Quality

Susceptibility of a drinking water source does *not* imply poor water quality. Actual water quality is best reflected by the results of regular water tests.

Water suppliers protect drinking water by monitoring for more than 100 chemicals, treating water supplies, and using source protection measures to ensure that safe water is delivered to the tap.

Prepared by the
Massachusetts Department of
Environmental Protection,
Bureau of Resource Protection,
Drinking Water Program

Date Prepared:
September 14, 2001

Table 1: Public Water System (PWS) Information

PWS NAME	Freetown Elementary School
PWS Address	43 Bullock Road
City/Town	Freetown, Massachusetts
PWS ID Number	4102008
Local Contact	Robert Souza, Regional Facilities Manager
Phone Number	(508) 763-5121

Well Name	Source ID#	Zone I (in feet)	IWPA (in feet)	Source Susceptibility
Well #1	4102008-01G	200	503	Moderate
Well #2	4102008-02G	200	503	Moderate

Introduction

We are all concerned about the quality of the water we drink. Drinking water wells may be threatened by many potential sources of contamination, including septic systems, road salting, and improper disposal of hazardous materials. Citizens and local officials can work together to better protect these drinking water sources.

Purpose of this report:

This report is a planning tool to support local and state efforts to improve water supply protection. By identifying land uses within water supply protection areas that may be potential sources of contamination the assessment helps focus protection efforts on appropriate best management practices (BMPs) and drinking water source protection measures. Department of Environmental Protection (DEP) staff are available to provide information about funding and other resources that may be available to your community.

This report includes:

1. Description of the Water System
2. Discussion of Land Uses within Protection Areas
3. Recommendations for Protection
4. Attachments, including a Map of the Protection Areas

1. Description of the Water System

The two (2) wells for Freetown Elementary School comprise a public water supply currently serving drinking water to approximately 570 students and staff. The two wells are referred to as Well #1 and Well #2. Well #1 is an 8-inch well drilled to a depth of 100 feet and is located in the former boiler room of the school. Well #2 is 8-inch well drilled to a depth of 290 feet and is located north of the school. Well #1 and Well #2 both have a Zone I and Interim Wellhead Protection Area (IWPA) of 200 and 503 feet, respectively, based on water meter readings of 4630 gallons per day (refer to attachments for calculation methodology). The IWPA provides an interim protection area for a water supply well when the actual recharge area has not been delineated. The actual recharge area to the well may be significantly larger or smaller than the IWPA.

The well is located in an aquifer with a high vulnerability to contamination due to the

What is a Protection Area?

A well's water supply protection area is the land around the well where protection activities should be focused. Each well has a Zone I protective radius and an Interim Wellhead Protection Area (IWPA).

- **The Zone I** is the area that should be owned or controlled by the water supplier and limited to water supply activities.
- **The IWPA** is the larger area that is likely to contribute water to the well.

In many instances the IWPA does not include the entire land area that could contribute water to the well. Therefore, the well may be susceptible to contamination from activities outside of the IWPA that are not identified in this report.

What is Susceptibility?

Susceptibility is a measure of a well's potential to become contaminated due to land uses and activities within the Zone I and Interim Wellhead Protection Area (IWPA).

absence of hydrogeologic barriers (i.e. Clay) that can prevent contaminant migration. Please refer to the attached map of the Zone I and IWPA.

The well serving the facility has no treatment at this time. For current information on monitoring results and treatment, please contact the Public Water System contact person listed above in Table 1.

2. Discussion of Land Uses in the Protection Areas

There are a number of land uses and activities within the drinking water supply protection areas that are potential sources of contamination.

Key issues include:

1. **Inappropriate Activities in Zone Is;**
2. **Storage, Use and Handling of Hazardous Materials and Oil,**
3. **Floor drains,**
4. **Protection Planning-Land Acquisition,**
5. **Septic System,**
6. **Stormwater Catchbasin,**
7. **An Aboveground Storage Tank (AST) With Heating Oil.**

The overall ranking of susceptibility to contamination for the well is Moderate, based on the presence of at least one Moderate threat land use or activity in the IWPA, as seen in Table 2.

1. **Zone Is** – Currently; both wells do not meet DEP's restrictions, which only allow water supply related activities in Zone Is. The Well #1 Zone I contains school buildings, septic tanks, pole transformers, athletic fields, school parking areas, and recreational activities. The Well #2 Zone I contains a dumpster, school buildings, school parking lot and landscaped areas. The public water supplier does own and/or control all land encompassed by the Zone I. Please note that systems not meeting DEP Zone I requirements must get DEP approval and address Zone I issues prior to increasing water use or modifying systems.

Recommendations:

- ✓ To the extent feasible, remove all non-water supply activities from the Zone I to comply with DEP's Zone I requirements.
- ✓ Do not exceed the average daily withdrawal limit for this public water system of 4630 gallons per day.
- ✓ Do not use or store fertilizers or road salt within the Zone I.

Table 2: Table of Activities within the Water Supply Protection Areas

Potential Contaminant Sources	Zone I	IWPA	Threat	Comments
Floor Drain	Well #1	Well #1, #2	High	Both boilers and all related equipment were removed from vicinity of Well #1
Storage, use, and handling of hazardous materials and oil	Well #1, #2	Well #1, #2	Moderate	Gasoline, lawnmowers, oil, paint, cleaning supplies, etc.
Parking lot, driveways & roads	Well #1, #2	Well #1, #2	Moderate	
Athletic Field	Well #1	Well #1, #2	Moderate	Fertilizer use
Septic System	No	Well #1	Moderate	Refer to septic systems brochure in the attachments
Fuel Storage Above Ground	No	Well #3	Moderate	12,000 gallon heating fuel tank, double walled, 110 percent secondary containment
Structures	Well #1, #2	Well #1, #2	-	Non-water supply structures in Zone I

* -For more information on Contaminants of Concern associated with individual facility types and land uses please see the SWAP Draft Land Use / Associated Contaminants Matrix on DEP's website - www.state.ma.us/dep/brp/dws/.

Glossary

Zone I: The area closest to a well; a 100 to 400 foot radius proportional to the well's pumping rate. To determine your Zone I radius, refer to the attached map.

IWPA: A 400 foot to ½ mile radius around a public water supply well proportional to its pumping rate; the area DEP recommends for protection in the absence of a defined Zone I I. To determine IWPA radius, refer to the attached map.

Zone II: The primary recharge area defined by a hydrogeologic study.

Aquifer: An underground water-bearing layer of permeable material that will yield water in a usable quantity to a well.

Hydrogeologic Barrier: An underground layer of impermeable material that resists penetration by water.

Recharge Area: The surface area that contributes water to a well.

V Well #2 is a vault/pit installation. Pit installations for water supply wells are not approved by the Department due to the safety concerns associated with confined spaces, as well as the potential for the flooding of the Wellhead that could affect sanitary quality of the water being delivered. Consider eliminating the well pit as part of any future modifications to Well #2.

2. **Storage, Use, and Handling of Hazardous Materials** – A storage room located adjacent to the gym is located within the Zone I of Well #1. There was no evidence of significant amounts of materials storage or spills. The school has speedy dry available for small spills and uses a salt substitute on the parking lots. Although the garage has a cement floor and there are no floor drains, the materials kept within the garage (gas cans, a lawnmower, boiler fuel additives, waste oil, paint, cleaning supplies, etc.) pose a potential treat to the well due to proximity and the potential for accidental release.

Recommendations:

V It is recommended that an alternative storage facility, away from the Zone I be considered.

3. **Floor Drains** – A floor drain was observed in boiler room "A". According to school staff the floor drain is connected to the septic system. Discharge from boiler room floor drains is considered industrial waste water and MUST go to a DEP approved tight tank or the drains must be sealed, and staff should be trained on proper disposal of hazardous materials and hazardous waste disposal practices. In a September 14, 2001 letter to the Department, school staff indicated that during remodeling the boiler and all related equipment were removed including all underground oil lines.

Recommendation:

V Seal the floor drain if the floor drain is not needed. Plumbing inspector approval is required before sealing the floor drain. Department form WS-1 is attached for this purpose.

4. **Comprehensive Wellhead Protection Planning-** Consider well relocation if Zone I threats cannot be mitigated. There is currently significant forest abutting the school property. This land may be able to provide a location for a new water source, which would have the appropriate Zone I radii. This new source would be to replace the existing nonconforming wells. The new well may become necessary if the school plans to expand or the existing wells are contaminated or cannot produce sufficient

quantities of water to supply the school.

Additionally, future development within the IWPA is a major concern. The Department observed recent development of surrounding properties during the site visit.

Recommendation:

V Work with the Selectmen, Board of Health and Planning Board to monitor land uses within and proximal to the IWPA. Refer to the Wellhead Protection Plan guidance and model bylaws for types of activities that should be prohibited and managed in the vicinity of water supplies, at <http://www.state.ma.us/dep/brp/dws/files/whplan.doc>.

V Create a Wellhead Protection Plan. Detailed instructions on many of these planning recommendations are listed in "Developing a Local Wellhead Protection Plan", available at <http://www.state.ma.us/dep/brp/dws/files/whplan.doc>.

V Develop a Land Acquisition Plan. Land acquisition protects water supplies by limiting the land's development potential. Acquisitions can be accomplished by municipal and non-municipal water systems through conservation restrictions,

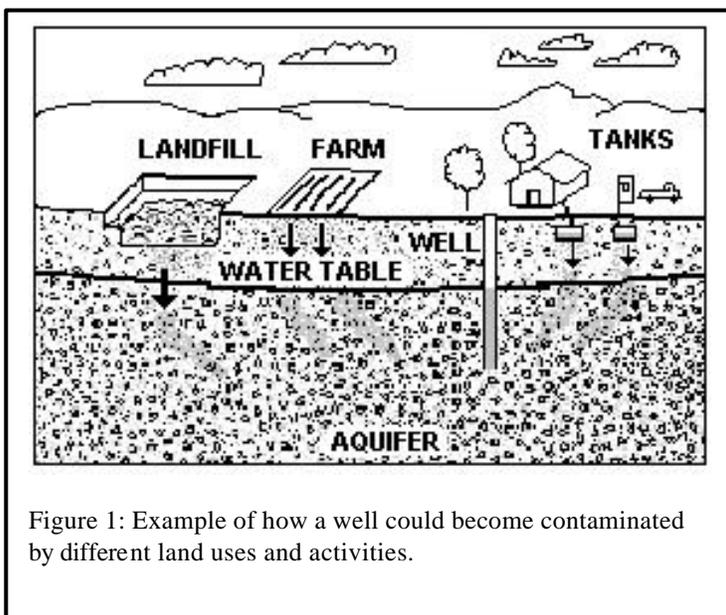


Figure 1: Example of how a well could become contaminated by different land uses and activities.

For More Information:

Contact Mark Dakers in DEP's Lakeville Office at (508) 946-2847 for more information and for assistance in improving current protection measures.

More information relating to drinking water and source protection is available on the Drinking Water Program web site at:
www.state.ma.us/dep/brp/dws/

Additional Documents:

To help with source protection efforts, more information is available by request or online at www.state.ma.us/dep/brp/dws/, including:

1. Water Supply Protection Guidance Materials such as model regulations, Best Management Practice information, and general water supply protection information.
2. MA DEP SWAP Strategy
3. Land Use Pollution Potential Matrix
4. Draft Land/Associated Contaminants Matrix

Copies of this assessment have been provided to the public water supplier, town boards, and the local media.

land banking, land purchases and land donation. Sample conservation restrictions are available at: <http://www.state.ma.us/dep/brp/dws/>.

- 5. Septic Systems** - The septic system consists of leaching field located approximately 325 feet southwest of Well #1. If a septic system fails or is not properly maintained it is a potential source of nutrients and microbial contamination. Improper disposal of household hazardous chemicals to the septic system is also a potential source of contamination to the water supply.

Recommendations:

- V Septic system components should be located, inspected, and maintained on a regular basis. Refer to the attachments for more information regarding septic systems.
- V Educate workers on septic systems about using cleaning compounds that are safe for the septic system, on proper disposal practices, i.e. only sanitary waste in the septic system. Workers should dispose of used oil, antifreeze, paints, and other household chemicals properly-not in septic systems. Information on septic systems can be found at mass DEP web site <http://www.state.ma.us/dep/brp/files/yoursyst.htm>
- V Monitor water usage, as exceeding the septic system design capacity could cause premature failure of the septic system.

- 6. Storm Water** – Storm water generated from the school parking area and runoff from the roof is redirected out of the Zone I of Well #1. The discharge pipe for the storm water system was observed approximately 350 the north of Well #1 in a wooded area. Catch basins transport storm water from the school parking lot and driveway and adjacent properties to the ground. As flowing storm water travels, it picks up debris and contaminants from streets, parking areas and lawns. Common potential sources of contamination include lawn chemicals, pet waste, leakage from dumpsters, household hazardous waste, and contaminants from vehicle leaks, maintenance, washing or accidents.

Recommendation:

- V Have catch basins inspected, maintained, and cleaned on a regular schedule.
- V Consider nonstructural techniques such as parking lot sweeping to reduce the amount of potential contaminants in storm water runoff. Additionally, the public water supplier may want to consider structural BMPs (e.g. stormwater swales, installation of curbs along the paved areas, detention basin, etc.) as part of a comprehensive storm water management plan for the site. To learn more refer to the *Storm Water Management Handbook, Volume 1 and 2* for information on BMPs and the other documents available at <http://www.state.ma.us/dep/brp/ww/wwpubs.htm>.

- 7. Aboveground Storage Tank (AST)** – A 12,000 gallons AST installed in 1999 is located in the IWPA for both wells. According to school staff, the tank is double walled, with 110% secondary containment capacity and has an overflow protection device. Freetown Elementary School is commended for its efforts to remove underground storage tanks in the Zone I of Well #1 and Well #2. A 5,000 and

2,500 gallon oil UST were removed from the Zone I of Well #1. A 10,000 gallon UST was removed from the Zone I of Well #2. If managed improperly, Aboveground Storage Tanks can be a potential source of contamination due to leaks or spills of the chemicals they store.

Recommendations:

- V Work with the local fire Department to ensure compliance with local code requirements regarding ASTs.
- V During refilling of AST, ensure that the operator of the oil transport tanker does not leave the vehicle while the AST is being filled.
- V Ensure that the delivery operator has determined the tanks available oil capacity to prevent overfilling (refer to 527 CMR 8.00).

Implementing the following recommendations will reduce the system's susceptibility to contamination.

3. Protection Recommendations

Implementing protection measures and best management practices (BMPs) will reduce the well's susceptibility to contamination. Pesticides are no longer applied at the Freetown Elementary School. Freetown should review and adopt the **key recommendations above** and the following:

Zone I:

- ✓ Keep non-water supply activities out of the Zone I.
- ✓ Prohibit public access to the well and pump house by locking facilities, gating roads, and posting signs.
- ✓ Conduct regular inspections of the Zone I. Look for illegal dumping, evidence of vandalism; check any above ground tanks for leaks, etc.
- ✓ If the school intends to continue utilizing the structures in the Zone I, use BMPs and restrict activities that could pose a threat to the water supply.

Training and Education:

- ✓ Train staff on proper hazardous material use, disposal, emergency response, and best management practices; include custodial staff, groundskeepers, certified operator, and food preparation staff. Post labels as appropriate on raw materials and hazardous waste.
- ✓ Drinking water signs were not observed during the SWAP site visit. Post drinking water protection area signs at key visibility locations.
- ✓ Work with your community to ensure that storm water runoff from town/state roads is directed away from the wells and is treated according to DEP guidance.

Facilities Management:

- ✓ Implement standard operating procedures regarding proper storage, use and disposal of hazardous materials. To learn more, see the hazardous materials guidance manual at www.state.ma.us/dep/bwp/dhm/dhmpubs.html.
- ✓ Implement Best Management Practices (BMPs) for the use of fertilizer and herbicides and on facility property.
- ✓ Two (2) telephone poles with transformers were observed within the Zone I of Well #1. For utility transformers that may contain PCBs, contact the utility to determine if PCBs have been replaced. If PCBs are present, urge their immediate replacement. Keep the area near the transformer free of tree limbs that could endanger the transformer in a storm.
 - **Recommendation implemented:** The PCBs transformer near Well #1 has been replaced with a non-PCB transformer.

Planning:

- ✓ Work with local officials in Freetown to include the facility IWPA's in Aquifer Protection District Bylaws and to assist you in improving protection.
- ✓ Have a plan to address short-term water shortages and long-term water demands. Keep the phone number of a bottled water company readily available.
- ✓ Supplement the SWAP assessment with additional local information and incorporate it into water supply educational efforts. Use a land use inventory to assist in setting priorities, focusing inspections, and creating educational activities.

Funding:

The Department's Wellhead Protection Grant Program provides funds to assist public water suppliers in addressing Wellhead protection through local projects. Protection recommendations discussed in this document may be eligible for funding under the "Wellhead Protection Grant Program". For additional information, please refer to the attached program fact sheet. Please note: each program year the Department posts a new Request for Response for the Grant program (RFR). Other funding opportunities are described in "Grant and Loan Programs: Opportunities for Watershed Protection, Planning and Implementation" at <http://www.state.ma.us/dep/brp/mf/files/glprgm.pdf>.

These recommendations are only part of your ongoing local drinking water source protection. Citizens and community officials should use this SWAP report to spur discussion of local drinking water protection measures.

4. Attachments

- Map of the Public Water Supply (PWS) Protection Area.
- Recommended Source Protection Measures Fact sheet
- Your Septic System Brochure
- Fertilizer Use Fact sheet
- Healthy Schools Fact Sheet
- Wellhead Protection Grant Program Fact Sheet
- Source Protection Sign Order Form
- Wellhead Protection Area Calculation Sheet